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INS study of spin stripe fluctuations in antiferromagnetic Pr2−xSrxNiO4+δ

Tuesday, 21 March 2023 16:00 (2 hours)

Spin and charge stripe correlations and their dynamics have been well explored in the ordered state of La-based 214-nickelates for last 3 decades. Recently, we have also explored magnetic excitations in the ordered spin-stipes phases of hole-doped Pr-based nickelates $Pr_{2-x}NiSrO_{4+\delta}$ [1-3]. In this regards, what remains less explored is the fluctuating state of the spin stripes from which the long-range spin stripes develop on cooling. In this talk, we present our recent inelastic neutron scattering study of the low energy spin stripe fluctuations in $Pr_{2-x}Sr_xNiO_{4+\delta}$ with magnetic incommensurability ϵ= 0.33 above the spin stripe ordering temperature T_{so} = 190 K [4]. The spin stripe fluctuations measured at the incommensurate wave vector show a non-dispersive character with no detectable anisotropy persisting up to a maximum energy 10 meV, and strongly suppressed already below the charge stripe ordering temperature T_{co} = 255 K. Our results clearly indicate that the presence of static charge stripe order is essential for the spin stripe fluctuations in 214-type nickealtes.

References:
[1] A. Maity et al., Physical Review Letters 124, 147202 (2020).
[2] R. Dutta et al., Physical Review B 102, 165130 (2020).
[3] A. Maity et al., Physical Review B (Letter) 103, L100401 (2021).
[4] A. Maity et al., Physical Review B 106, 024414 (2022).

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